



US009114715B2

(12) **United States Patent**
Takashima et al.

(10) **Patent No.:** **US 9,114,715 B2**
(45) **Date of Patent:** **Aug. 25, 2015**

(54) **ELECTRONIC CONTROL UNIT**

USPC 320/109, 104, 134; 701/22; 307/9.1
See application file for complete search history.

(71) Applicants: **KEIHIN CORPORATION**, Tokyo (JP);
HONDA MOTOR CO., LTD., Tokyo
(JP)

(56) **References Cited**

(72) Inventors: **Yuzuru Takashima**, Utsunomiya (JP);
Masaki Tanno, Utsunomiya (JP);
Takeshi Yamada, Tokyo (JP); **Haruki**
Umeya, Utsunomiya (JP); **Shinichi**
Daibo, Utsunomiya (JP)

U.S. PATENT DOCUMENTS

8,198,855 B2 * 6/2012 Fukui et al. 320/104
8,258,744 B2 * 9/2012 Ishii et al. 320/104

(Continued)

(73) Assignees: **KEIHIN CORPORATION** (JP);
HONDA MOTOR CO., LTD. (JP)

FOREIGN PATENT DOCUMENTS

JP H06098585 A 4/1994
JP H1165878 A 3/1999

(Continued)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 314 days.

OTHER PUBLICATIONS

(21) Appl. No.: **13/653,815**

Japanese Notice of Reasons for Rejection corresponding to Applica-
tion No. 2011-231809; Date of Mailing: May 26, 2015, with English
translation.

(22) Filed: **Oct. 17, 2012**

Notice of Reasons for Rejection for corresponding Japanese Appli-
cation No. 2011-231808, Date of Mailing Jul. 7, 2015; with English
Translation.

(65) **Prior Publication Data**

US 2013/0099740 A1 Apr. 25, 2013

(30) **Foreign Application Priority Data**

Oct. 21, 2011 (JP) 2011-231806
Oct. 21, 2011 (JP) 2011-231808
Oct. 21, 2011 (JP) 2011-231809

Primary Examiner — M'Baye Diao

(74) *Attorney, Agent, or Firm* — Cantor Colburn LLP

(51) **Int. Cl.**

H02J 7/14 (2006.01)
H02J 7/00 (2006.01)
B60L 1/00 (2006.01)
B60L 11/00 (2006.01)

(Continued)

(52) **U.S. Cl.**

CPC **B60L 11/1816** (2013.01); **B60L 3/00**
(2013.01); **Y02T 10/7005** (2013.01); **Y02T**
90/14 (2013.01)

(58) **Field of Classification Search**

CPC B60L 11/182; B60L 11/18; H02J 7/0031;
Y02T 10/72; Y02T 10/92; Y02T 10/7077

(57) **ABSTRACT**

A processor of an electronic control unit performs at least one of a first diagnosis process of determining whether or not a switching element is abnormal based on a signal output from an abnormality diagnosis circuit in a state where a first diagnosis voltage supply circuit is controlled to supply a first diagnosis voltage to a control line and a second diagnosis process of determining whether or not a pilot signal line is abnormal based on the signal output from the abnormality diagnosis circuit obtained in a state where a second diagnosis voltage supply circuit is controlled to supply a second diagnosis voltage to the pilot signal line.

13 Claims, 10 Drawing Sheets

